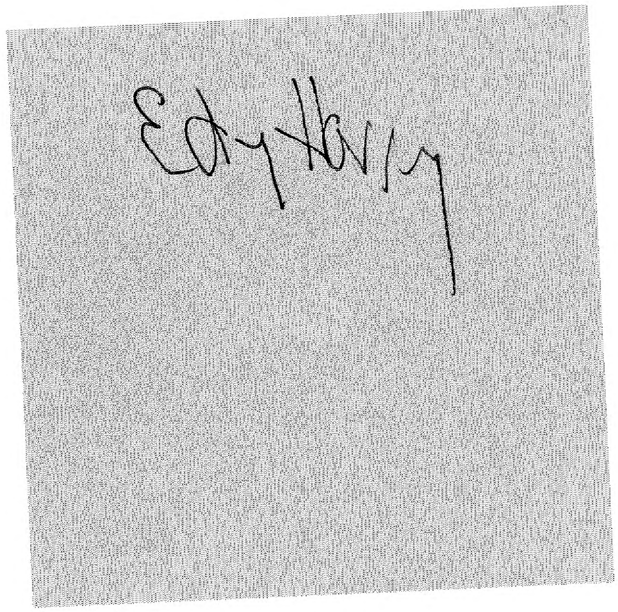


HOTJAVA

Bringing Interactivity to the Internet

Dr. Eric Schmidt
Sun Microsystems, Inc.

What is HotJava?

- Less than Mosaic: it understands no protocols or data types
- More than Mosaic: it knows how to find out about things it doesn't understand
- Based on the ability to safely download code
- From remote hosts

Background of Internet

- Began in 1950's as government/education "indestructible" nationwide network
- 1990's:
  - government role diminished
  - Mosaic launched the Web revolution
- Today:
  - 30+ million users
  - 4.8 million hosts
  - 27,000 Web servers, doubling every two months
  - 1 million active Web users

The Web Today

- An eclectic environment
  - vast series of interconnected networks
  - wide range of platforms
  - constantly evolving protocols
- Security not designed in
- Bandwidth strained to limits
- No real interactivity

New focus on commerce, but expectations are beyond current capabilities

Conventional Web Browsers

- Limited to static viewing of text and images
- Pages can't contain behavior
- Can't handle new, unfamiliar protocols
- Platform dependent
- Clients are "dumb"

HotJava: *Dynamic* Web Browser

- Brings true interactivity to the Web
- Transforms static Web pages
- Embeds live applications
- Extensible: "learns" new protocols on the fly
- Fully compatible with existing browsers
- No added system/bandwidth impact

HotJava: Comprehensive Solution

Based on Java object-oriented language

- Dynamic
  - applications load transparently
  - applications are extensible
  - no software installation necessary
- Secure
  - maximum virus protection
  - encryption and authentication
- Architecture-Neutral
  - runs on any OS and CPU
- Distributed
  - local and remote access to objects

Java: Programming for the Net

- Network-Centric Application Development
  - easy to learn and use
  - reduces bugs
  - secure
  - extremely scalable
  - dynamic
  - high performance
  - cross-platform
  - rich class libraries for GUI
  - network-ready
- Create Interactive, Secure, Distributed Apps

HotJava Brings the Web to Life

Enabling:

- real-time portfolio management
- interactive advertising and shopping
- customized, animated newspapers
- live spreadsheets
- interactive advertisements
- 3-D science simulations
- live chats, online games
- interactive customized forms
- ...and much more

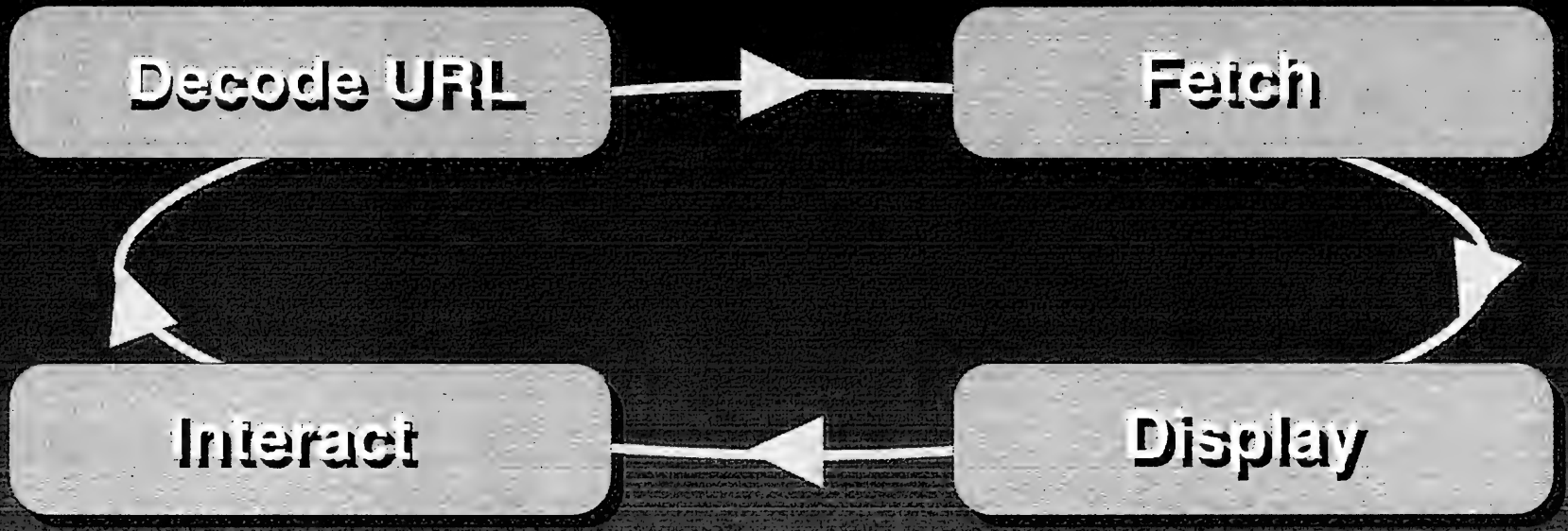
sun microsystems

Project History

- Research looking into building:
  - Small, reliable, safe, long lived, processor independent, real-time, distributed systems
- C++ started to crumble:
  - Processor independent & long lived required different compiler technology
  - When we looked into reliable and safe, the language had to change too
- Then the WWW happened!

WWW Background

- Mosaic: a browser for the WWW
- The basic structure is simple



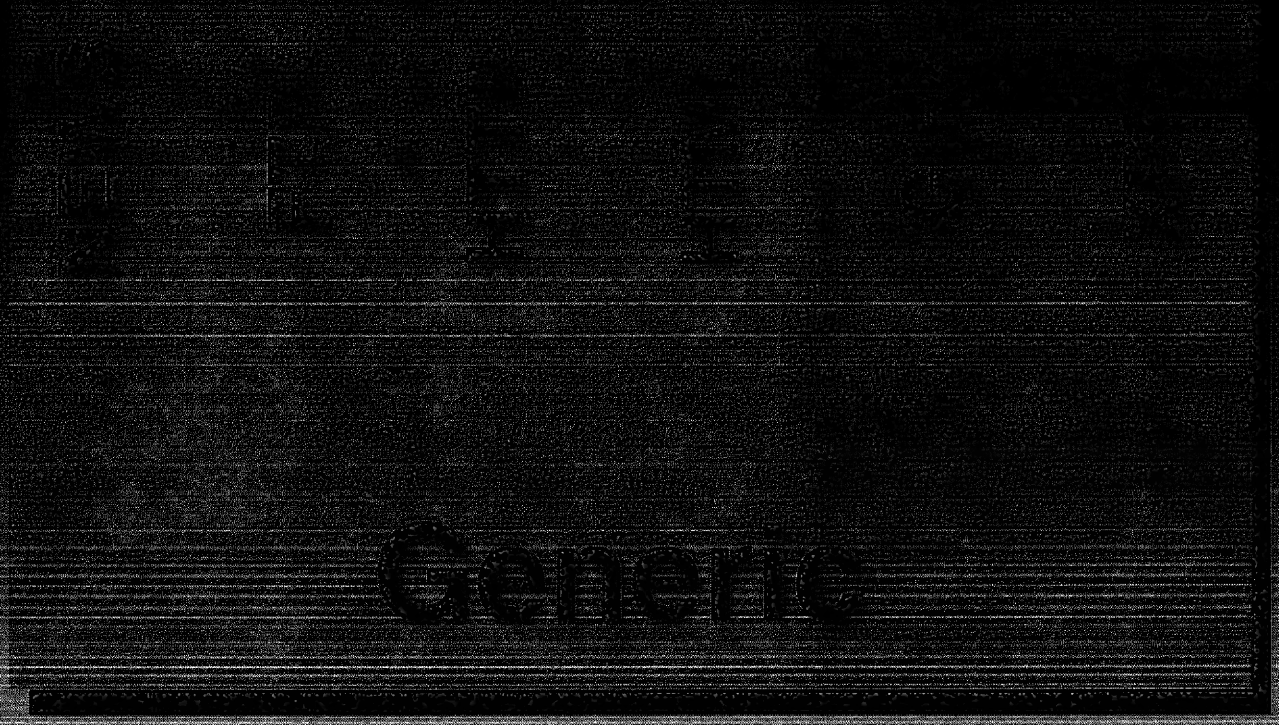
- Significant complexity from the many data types and protocols supported

The WEB & Mosaic

- Pages are essentially static things.
  - Very book-like
  - With amazing indexing
- Depends on locally installed handlers
- New behavior requires new standards and readers
- Getting new things out is hard

Conventional Browser

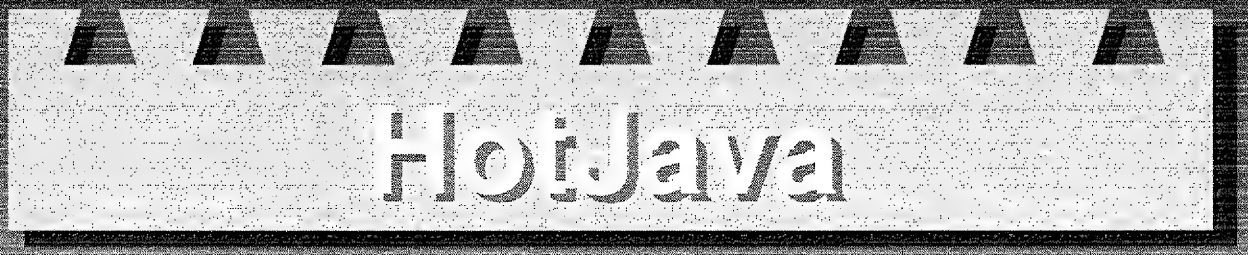
- Many standards built in



- It's a solid unchanging chunk

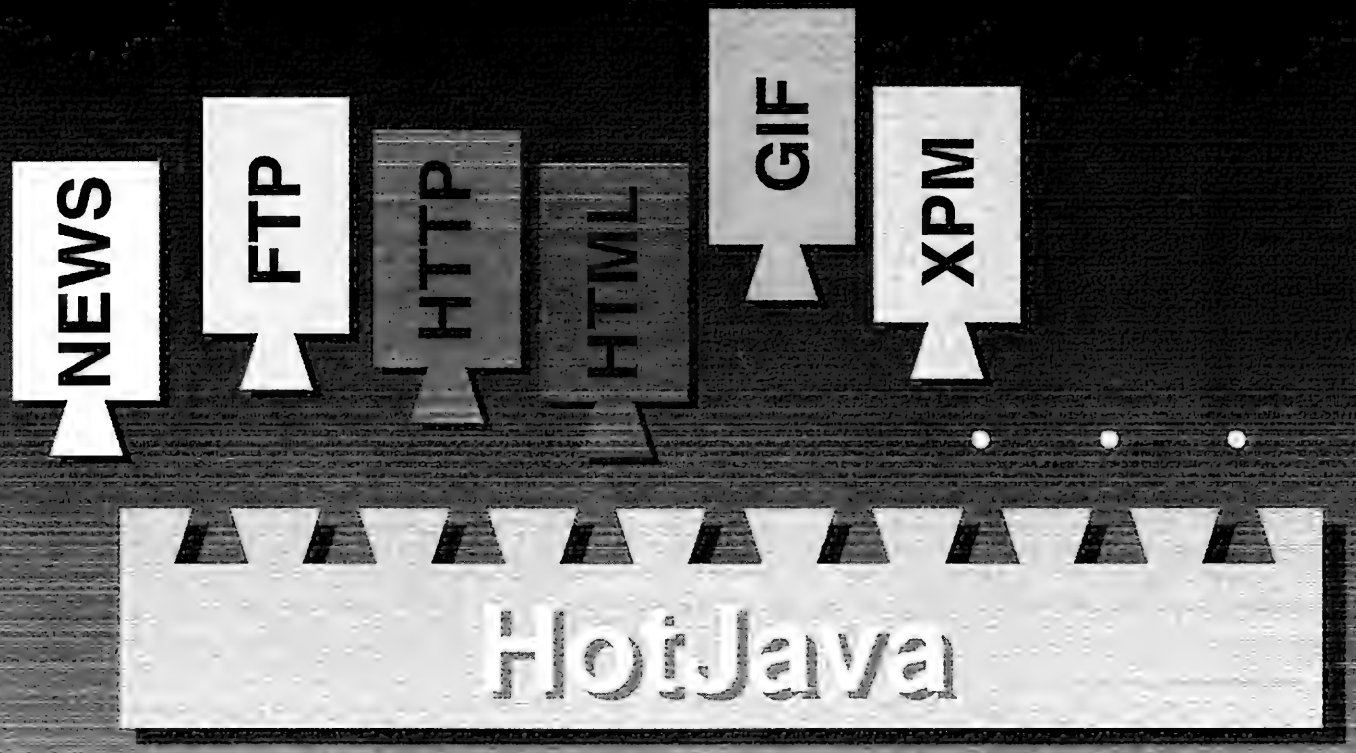
HotJava...

- Just a platform for plugging things in:



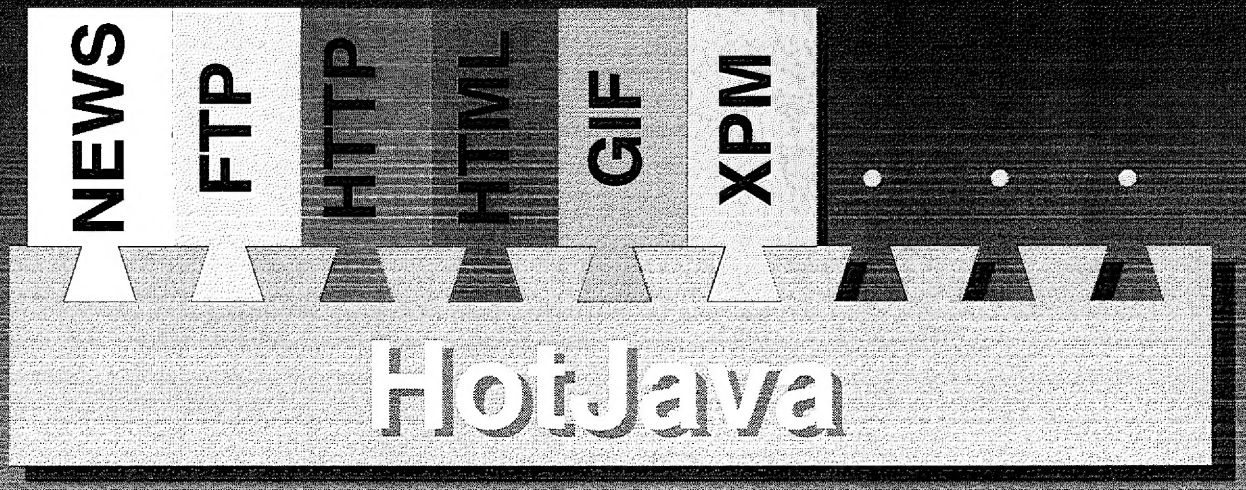
HotJava...

- Implementations of standards come in from the outside:



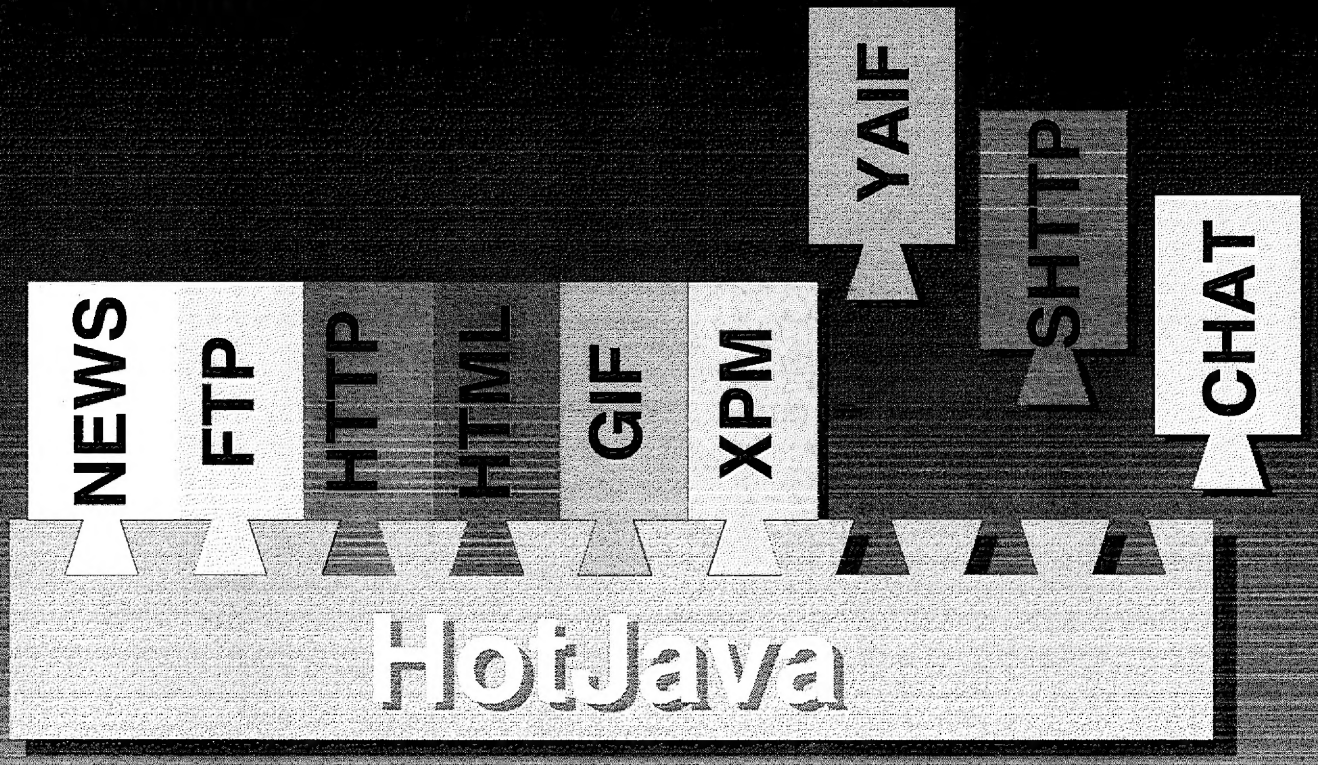
HotJava...

- And snap into place:



HotJava...

- Can have new, unthought-of things brought in later:



What can you do with it?

- New protocols: if it doesn't understand the protocol field of a url, it finds out
- New data types: if it doesn't understand a mime type field, it finds out
- New embedded items: if it finds one it doesn't understand, it finds out

Applications

- html pages with new kinds of items (eg. a fractal curve)
- html pages with interactive items (eg. embed in a physics text an interactive simulation)
- invent new protocols without having to install new clients all over the network
- have many protocols (eg. security and billing) from several sources work together in the same client